Oct. 22, 1935. C. F. BALL 2,018,112

MIXER AND AGITATOR FOR CONCRETE AND THE LIKE

Filed March 9, 1932 2 Sheets-Sheet 1

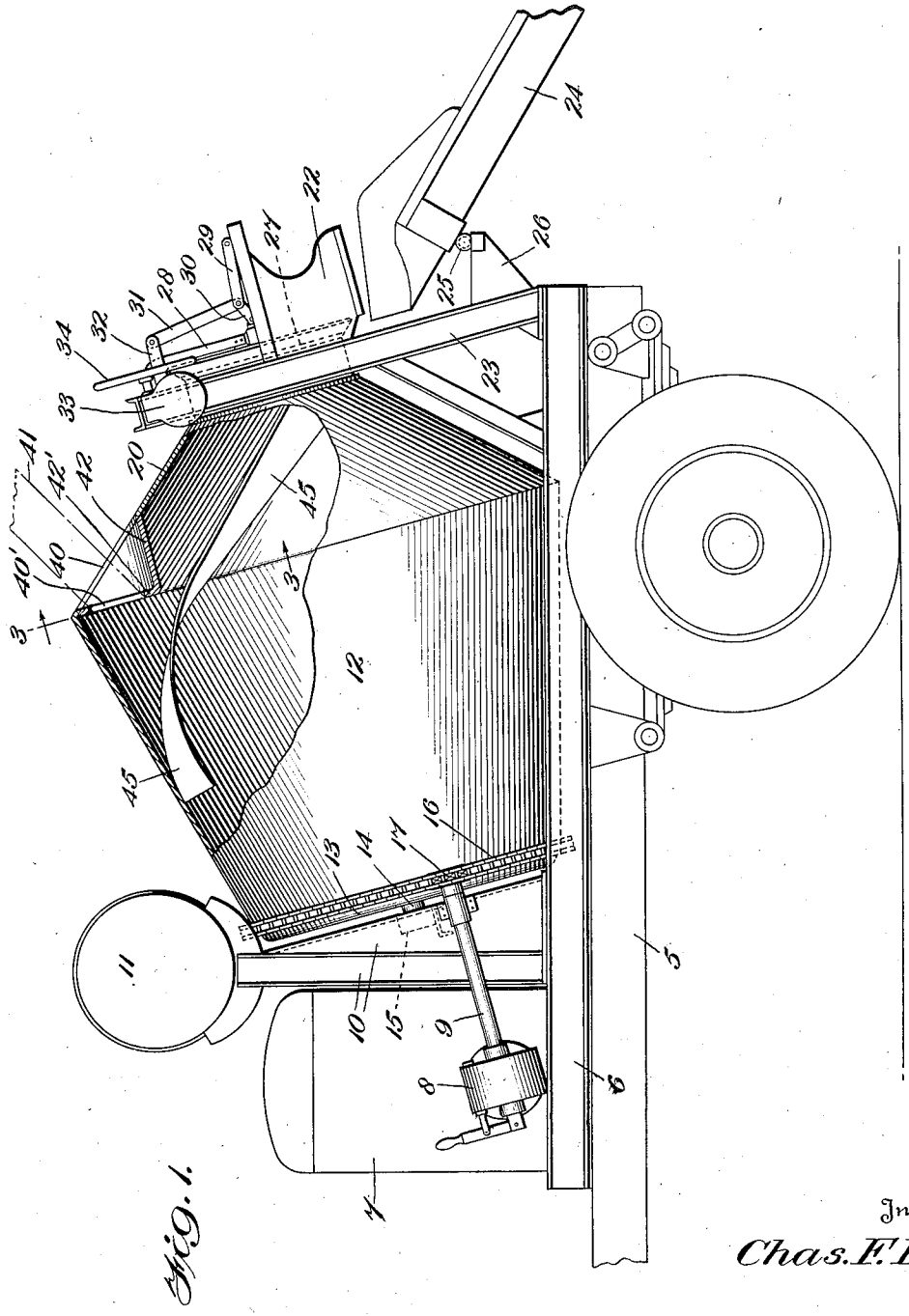


FIG. 1.

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Fig. 2.

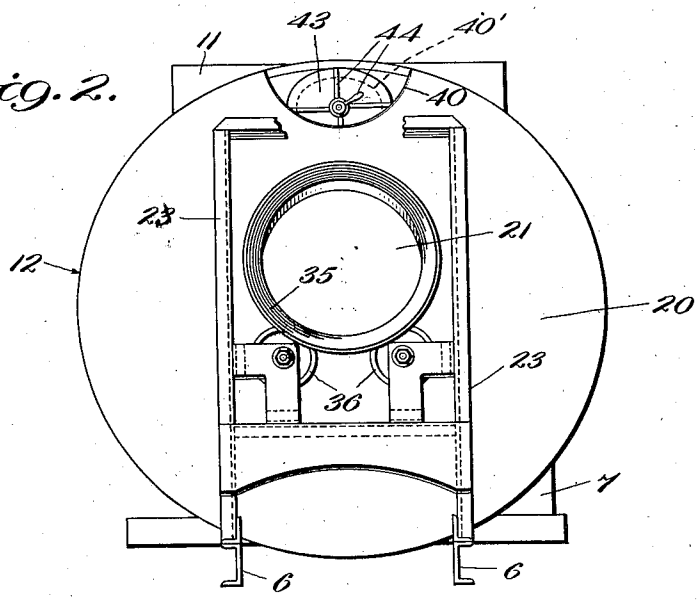
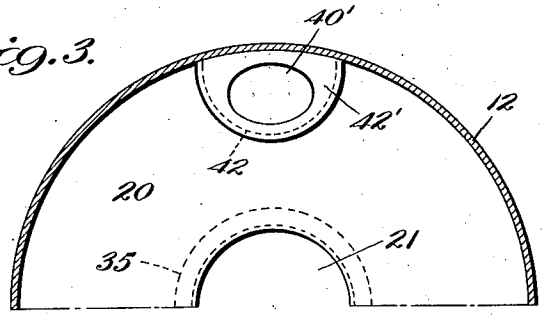


Fig. 3.



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UNITED STATES PATENT OFFICE

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MIXER AND AGITATOR FOR CONCRETE AND THE LIKE

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Application March 9, 1932, Serial No. 597,829

5 Claims. (Cl. 83—73)

This invention relates to mixers and agitators for concrete and the like, and has for one of its objects to provide an apparatus of this character which is particularly, although not exclusively, intended for use as a truck or transit mixer and in which the advantages of the so-called high discharge from the mixing receptacle are attained while at the same time the center of gravity of the apparatus is maintained at substantially its lowest feasible point to reduce any tendency of the apparatus to upset during discharge.

Another object of the invention is to provide a mixing apparatus of the class above described having special facilities for charging of the constituents of the mixture into the mixing receptacle.

A still further object of the invention is to provide a mixing and agitating apparatus of the class described which will be simple in construction, comparatively inexpensive to manufacture and more efficient in use than those which have been heretofore proposed.

In my prior U. S. application filed May 16, 1931, Serial No. 537,926 entitled High discharge concrete mixer and method of operating the same, I have fully described and claimed an apparatus in the form of a truck mixer having a mixing receptacle which, during transit is maintained in a normally horizontal position and which for discharge purposes has its rear or discharge end elevated in order that the discharge opening may be raised as much as 2½ feet above its normal position during discharge to attain certain desirable results fully set forth in the said application and among which are an increase in the chuting range of discharge. In said prior application the elevation of the discharge end of the mixing receptacle is accomplished through pivotally mounting the mixing or agitating unit upon the chassis of the motor vehicle forwardly of the center of gravity of the unit, and providing a suitable hoist mechanism whereby the entire agitating unit may be rocked about the pivot to elevate the rear or discharge end.

As was clearly brought out in said prior application, it is of extreme importance, particularly in mixers of the rotating drum type, to maintain the center of gravity of the apparatus at as low a point as possible in as much as the torque of starting a fully loaded drum for discharge purposes is considerable and exerts a force tending to tip the machine over sideways. Furthermore, the relatively high speeds at which these machines are operated over the highways make it desirable that the center of gravity be maintained at as low a point as possible in order to minimize the tendency to overturn when rounding curves. While the construction of the said prior application is such as to result in only a very slight raising of the center of gravity when the agitating unit is tipped for discharge, in contrast thereto the present invention provides an apparatus in which the advantageous results of high discharge may be attained without raising the center of gravity of the machine from its normal position. This is accomplished through the provision of a conical or frusto conical mixing receptacle which is mounted for rotation upon the horizontal frame with its axis fixedly inclined upwardly toward the rear whereby the discharge opening which is provided in the rear end wall is permanently elevated above what it would be were the receptacle mounted with its rotative axis horizontal and parallel to the framework.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel details of construction and combinations of parts more fully hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a part of this specification in which like reference characters designate like parts in all the views:—

Figure 1 is a side elevational view, partly broken away, of a portion of a truck chassis having mounted thereon a mixing or agitating unit constructed in accordance with the present invention;

Figure 2 is an end elevational view as seen from the right of Figure 1, of the agitating unit shown therein, the discharge closure, its operating mechanism and the distributing hopper and chute being omitted; and

Figure 3 is a fragmentary transverse sectional view taken approximately on the plane indicated by the line 3—3 of Figure 1, looking in the direction of the arrows and showing the charging opening provided in the rear wall of the receptacle.

In the said drawings 5 indicates the chassis frame of a motor or other vehicle which of course normally occupies a substantially horizontal position and to which is rigidly secured the longitudinal sills 6 of a mixing and agitating unit, which may comprise an independent motor or source of power enclosed within a housing 7 and adapted to drive through suitable clutch and transmission mechanism 8, a shaft 9. Immediately behind the motor housing 7 there is pro-

vided upright frame members 10 which may support a water supply tank 11 for furnishing the necessary water to the mixing receptacle in the manner common to this type of apparatus.

The mixing and agitating receptacle 12 preferably takes the form of a truncated cone, the smaller end of which 13 is closed, except for the water pipe which enters at its rotative axis through the forward journal 14 which is mounted in a suitable bearing 15 as shown in Figure 1. The said forward end of the receptacle is provided with a sprocket which is engaged by a chain 16 which likewise passes about a smaller sprocket 17 carried by the power shaft 9 whereby power may be transmitted to the receptacle to rotate the same in either direction.

The larger end of the receptacle which is mounted toward the rear of the vehicle is closed by an end wall 20 which is preferably coned reversely to the main body portion of the drum and which is provided with an axial discharge opening 21, see Fig. 2, through which the mixture may be discharged into a hopper 22 supported by upstanding frame members 23. From the hopper 22 the material may drop into the upper end of a discharge chute or spout 24 which may be mounted upon a universal mounting 25 carried by a swinging arm 26, all as is disclosed in the prior U. S. application filed jointly by Alexander Foster, Jr. and myself January 20, 1931, Serial No. 510,004, entitled Discharge and distributing mechanism for concrete mixers now Patent No. 1,890,982 dated December 13, 1932.

The said discharge opening 21 may be closed during transit and mixing by any suitable closure 27 which may be supported and operated in any desired manner, as for example by means of the mechanism described and claimed in my prior co-pending application filed August 1, 1931, Serial No. 554,539. This mechanism comprises a pivoted arm 29 for supporting the closure disk 27 for swinging movements to and from its closing position, and toggle operating and locking links 29, 30 and 31 movable by an arm 32 operated through suitable gearing contained in housing 33 by means of the hand wheel 34, all as fully set forth in said co-pending application Serial No. 554,539. Obviously other closure mechanism may be employed, as that shown, as well as the distributing chute 24, is for illustrative purposes only since these features in themselves constitute no part of the present invention.

The end wall 20 of the receptacle at the discharge opening 21 is provided with a bearing ring 35 which likewise constitutes a drip ring and the outer periphery of the said ring rests upon the supporting rollers 36 to constitute the rear bearing for the receptacle 12. As clearly shown in Figure 1, the conical receptacle 12 is mounted with its rotative axis inclined upwardly toward the rear, which of course results in an elevation of the discharge opening 21 above the position it would occupy if the receptacle were mounted with its axis horizontal and its lowermost point maintained in substantially the same horizontal plane. It will of course be understood that because of structural limitations imposed by the truck chassis 5 it is impractical to lower the bottom of the receptacle beyond the point shown in Figure 1, so that if the receptacle 12 were mounted with its axis horizontal it would necessarily mean that the discharge opening 21 would occupy a position appreciably lower than it does when the receptacle is mounted with its axis inclined as shown. Of course in the present construction, the receptacle permanently occupies this position and it is not necessary to provide hoist means for elevating the rear end as in my prior co-pending application Serial No. 537,926, although the present construction attains the same advantageous results flowing from the high discharge as are set forth in the said prior application.

For the purpose of facilitating the charging of the raw material into the receptacle 12, the rear wall 20 thereof may be cut away as at 40 at a point adjacent its outer periphery for the reception of a charging chute or spout 41. It is preferred to surround the cut-away portion 40 with a curved plate 42 welded or otherwise secured to the wall 20 and extending inwardly therefrom substantially as shown in Fig. 1. The said plate 42 terminates in a transverse wall or partition 42' disposed substantially perpendicular to the axis of the receptacle 12, and provided with a charging opening 40', the axis of which is substantially parallel to the axis of the receptacle 12 and the discharge opening 21. The purpose of this construction is to insure the entry of the chute 41 in such a manner as to cause materials therefrom to be directed forwardly at least to the center of the receptacle, since it is the customary practice in the operation of truck mixers to charge the receptacles more nearly full than in other concrete mixer work, and if the wall 20 were merely cut away as at 40, it might frequently happen that the charging spout 41 would be entered therein in such a manner as to discharge the materials only at the rear of the receptacle, with the result that much valuable space toward the forward end would be lost. The charging opening 40' may be normally closed during mixing and transit by a hatch-cover such as 43 which may be retained in place by suitable locking mechanism 44, see Figure 2.

As is customary in this type of mechanism the interior of the receptacle is provided with blades or vanes 45 which are so positioned and disposed as to not only produce an agitation of the constituents of the mixture during rotation but also to produce an end-wise movement thereof toward the forward end when the drum is rotated in one direction, and to produce an endwise movement toward the rear while continuing the agitation when the drum is rotated in the opposite direction. These blades or vanes are therefore adapted to move the mixture upwardly toward and through the elevated discharge opening 21 while at the same time continuing the agitation to prevent segregation of the mix, as will be readily undersood by those skilled in the art.

Although for illustrative purposes the invention has been shown and described as comprising a rotative drum which is driven by an independent motor, it is of course obvious that power for such drive may if desired be derived through a power take-off from the truck motor or the usual truck transmission.

The end wall 20 need not necessarily take the form of a straight sided cone, as obviously the sides thereof may be formed longitudinally as circular or parabolic arcs, and the said wall as well as the receptacle 12 may be polygonal instead of circular in cross section if so desired.

It will be obvious therefor that while one form of the invention has been illustrated and described, those skilled in the art may vary the details of construction as well as the precise arrangement of parts without departing from the spirit of the invention, and it is not wished to be

limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. A mixing receptacle for concrete mixers and the like having a substantially coniform end wall provided with a portion toward its outer perimeter extending substantially perpendicular to the axis of said receptacle and having a charging opening therethrough.

2. A mixing receptacle for concrete mixers and the like having a substantially coniform end wall, a portion of which adjacent its outer perimeter is deflected to extend forwardly in a plane substantially parallel to the axis of said receptacle, and then outwardly in a plane substantially perpendicular to said axis, said last mentioned portion being provided with an opening therethrough.

3. In a high-discharge truck mixer or agitator for concrete and the like, a frame; an agitating receptacle having a coniform body portion, mounted on said frame with its axis fixedly inclined and with the lower portion of its side wall substantially horizontal, whereby the center of gravity is located at the lowest feasible point, said receptacle being provided with a reversely coned end wall of less conicity than said body portion, closing the larger end of the latter, said end wall having an axial discharge opening and an offset portion adjacent its perimeter provided with a charging opening, the axis of which is substantially parallel to the axis of said body portion; and means for rotating said receptacle.

4. A mixing receptacle for concrete mixers and the like having a relatively flat coniform end wall provided with a discharge opening and an offset portion having a charging opening therein, the axis of the latter being substantially parallel to the axis of the receptacle.

5. A mixing receptacle for concrete mixers and the like having a relatively flat substantially coniform end wall provided with a central discharge opening and an offset portion having a charging opening therein, the axes of said openings being substantially parallel.

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